

ABSTRACT

An electronic assembly may be contained in a label that performs time-temperature integration (TTI) and indicates that time and/or temperature levels have been reached that may compromise the quality, shelf life, or safety of the item to which the label is affixed. The label may be used on a wide variety of objects that require careful handling in terms of temperature and/or time elapsed before use. The labeling system includes circuitry that measures and calculates, and indicator(s) that signal that the time has come for discounted sale, and, later, that the time has come for disposal rather than sale. Optionally, the circuitry may act as an “over-temperature alarm” system, to measure, calculate, and indicate when a one-time temperature violation has occurred that is of such a magnitude that the item is immediately considered compromised or spoiled. The label may take the form of a flexible, disposable label that is typically powered by a small battery. Methods may include providing a temperature-variable oscillator or time-base, counting cycles of said oscillator within a logic circuit to determine when one or more preset total cycle counts is/are reached, and signaling when said total cycle count(s) is/are reached.